

**Automatic Burst Mode I/Q Gain and I/Q Phase Calibration Using Packet  
Based-Fixed Correction Coefficients**

*This application is a continuation in part of 10,350,622, filed on  
January 24, 2003.*

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**BACKGROUND OF THE INVENTION**

**Field of the Invention**

10       The invention relates generally to signal receivers having in-phase (I) and  
quadrature phase (Q) signal processing and more particularly to methods and apparatus for  
balancing I/Q gain and I/Q phase in a signal receiver.

**Description of the Prior Art**

15       Most modern radio signal receivers estimate the data that was transmitted by  
processing in-phase (I) and quadrature phase (Q) signal components. The I and Q signals  
should have a phase difference (I/Q phase) of  $90^\circ$  at the carrier frequency of the incoming  
signal and a gain ratio (I/Q gain) of unity. However imperfections in the analog circuitry  
used in the radio frequency (RF) quadrature downconverters in most modern signal  
20       receivers cause the I/Q gain and I/Q phase to be out of balance (I/Q gain not equal to one  
and I/Q phase not equal to  $90^\circ$ ). These imbalances cause a degradation in bit error rate  
(BER) in estimating the transmitted data.

25       Existing signal receivers use several methods for correcting I/Q gain and I/Q phase  
imbalances within the receivers. In one method, an offline test signal is used during  
manufacture or installation to align the I/Q gain to unity and the I/Q phase to  $90^\circ$  in the  
signal receiver. However, the performance of the receivers using the test signal method is  
limited by drift in the analog circuitry after the alignment. This limitation is reduced by

